US009161184B2

(12) **United States Patent**
Casto et al.

(10) **Patent No.: US 9,161,184 B2**
(45) **Date of Patent: Oct. 13, 2015**

(54) **ALPHANUMERIC ADDRESS MAPPING FOR NON-HOMOGENEOUS SHORT MESSAGE NETWORKS**

(75) Inventors: **Paul Casto**, Bowie, MD (US); **Lewis Tuttle**, Stevensville, MD (US); **Donghong Gao**, Clarksville, MD (US)

(73) Assignee: **TeleCommunications Systems, Inc.**, Annapolis, MD (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 513 days.

(21) Appl. No.: **13/374,356**

(22) Filed: **Dec. 23, 2011**

(65) **Prior Publication Data**

US 2012/0220320 A1 Aug. 30, 2012

Related U.S. Application Data

(60) Provisional application No. 61/457,084, filed on Dec. 23, 2010.

(51) **Int. Cl.**

H04W 4/14	(2009.01)
H04W 4/12	(2009.01)
H04L 29/12	(2006.01)
H04L 12/58	(2006.01)
H04M 15/00	(2006.01)
H04M 17/02	(2006.01)
H04W 24/00	(2009.01)
H04W 84/06	(2009.01)

(52) **U.S. Cl.**

CPC ***H04W 4/12*** (2013.01); ***H04L 51/28*** (2013.01); ***H04L 61/106*** (2013.01); ***H04M 15/55*** (2013.01); ***H04M 17/02*** (2013.01); *H04L 51/38* (2013.01); *H04M 2215/28* (2013.01)

(58) **Field of Classification Search**

CPC H04W 4/14

USPC 455/466, 418, 415, 424, 425, 428

See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

6,052,710 A 4/2000 Saliba
6,058,428 A 5/2000 Wang

(Continued)

OTHER PUBLICATIONS

International Search Report received in PCTUS2011/00210 dated Jul. 27, 2012.

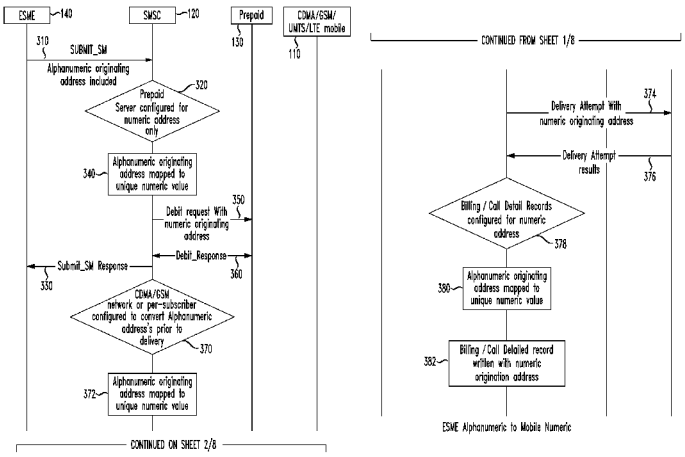
(Continued)

Primary Examiner — Muthuswamy Manoharan
(74) *Attorney, Agent, or Firm* — William H. Bollman

(57) **ABSTRACT**

Text messages with alphanumeric addresses are delivered to mobiles and external short message entities (ESMEs) which do not support alphanumeric addressing, providing meaningful fallback handling. Additionally, the invention enables delivery of SMPP messages from ESME or SMPP networks which can only originate numeric addresses, yet provide for mapping to alphanumeric addresses for delivery to the mobile. A two-way mapping is provided between alphanumeric addresses and SMS short-codes to enable delivery of text messages with alphanumeric addressing in networks which contain mobiles and/or ESME's that lack support of alphanumeric addressing. An ESME can send a text message using an alphanumeric origination address, without knowing which handsets support the capability, and which do not, or whether handsets are on CDMA, or GSM, or UMTS, or networks, or can continue to send using a numeric origination address. The SMSC provides conversions to alphanumeric addresses on behalf of the ESME and the mobile.

8 Claims, 8 Drawing Sheets



(56) **References Cited**

U.S. PATENT DOCUMENTS

6,128,653	A	10/2000	Del Val	
6,139,177	A	10/2000	Venkatraman	
6,459,904	B1	10/2002	Lorello	
6,564,249	B2	5/2003	Shiigi	
6,625,460	B1	9/2003	Patil	
6,665,489	B2	12/2003	Collart	
6,763,373	B2	7/2004	Shiigi	
6,801,781	B1	10/2004	Provost	
7,003,306	B2 *	2/2006	Henry-Labordere	455/466
7,072,984	B1	7/2006	Polonsky	
7,243,152	B2	7/2007	Guggisberg	
7,269,431	B1	9/2007	Gilbert	
7,319,882	B2	1/2008	Mendiola	
7,761,105	B2	7/2010	Harding	
8,046,011	B2 *	10/2011	Smith et al.	455/466
2001/0042107	A1	11/2001	Palm	
2002/0046253	A1	4/2002	Uchida	
2002/0077927	A1	6/2002	Lasnier	
2002/0126708	A1	9/2002	Skog	
2002/0198999	A1	12/2002	Smith	
2003/0028647	A1	2/2003	Grosu	
2003/0069975	A1	4/2003	Abjanic	
2003/0172121	A1	9/2003	Evans	
2003/0191805	A1	10/2003	Seymour	
2003/0200301	A1	10/2003	Trzcinko	
2003/0208558	A1	11/2003	Venkatraman	
2003/0217291	A1	11/2003	Schramm-Apple	
2003/0224809	A1	12/2003	Savinen	
2003/0224811	A1	12/2003	Jain	
2003/0234815	A1	12/2003	Delany	
2004/0002896	A1	1/2004	Alanen	
2004/0203614	A1	10/2004	Qu	
2004/0236710	A1	11/2004	Clary	
2005/0010694	A1	1/2005	Ma	
2005/0059418	A1	3/2005	Northcutt	
2006/0073810	A1	4/2006	Pyhalammi	
2007/0015501	A1 *	1/2007	Wilson	455/424
2007/0047702	A1	3/2007	Newell	
2007/0060131	A1	3/2007	Wilson	
2008/0160954	A1	7/2008	Agarwel	
2008/0270558	A1	10/2008	Ma	
2008/0281923	A1	11/2008	Barchi	
2009/0075627	A1	3/2009	Hwang	
2009/0191902	A1	7/2009	Osborne	
2010/0009701	A1	1/2010	Cai	
2010/0093315	A1	4/2010	Grosch	
2011/0053618	A1	3/2011	Lin	
2011/0055076	A1	3/2011	Trifiletti	
2011/0102172	A1	5/2011	Chiu	
2011/0151852	A1	6/2011	Olincy	
2011/0151902	A1	6/2011	Sweatman	
2011/0207438	A1	8/2011	Sanjeev	
2012/0220284	A1	8/2012	Tadayon	
2013/0316747	A1 *	11/2013	Bychkov et al.	455/466

OTHER PUBLICATIONS

International Preliminary Report on Patentability received in PCT/US2011/02004 dated Nov. 16, 2012.

International Search Report received in PCT/US2012/00086 dated Apr. 30, 2012.

International Search Report received in PCTUS2011/002004 dated Apr. 20, 2012.

International Search Report received in PCTUS2012/00086 dated Apr. 30, 2012.

* cited by examiner

FIG. 1

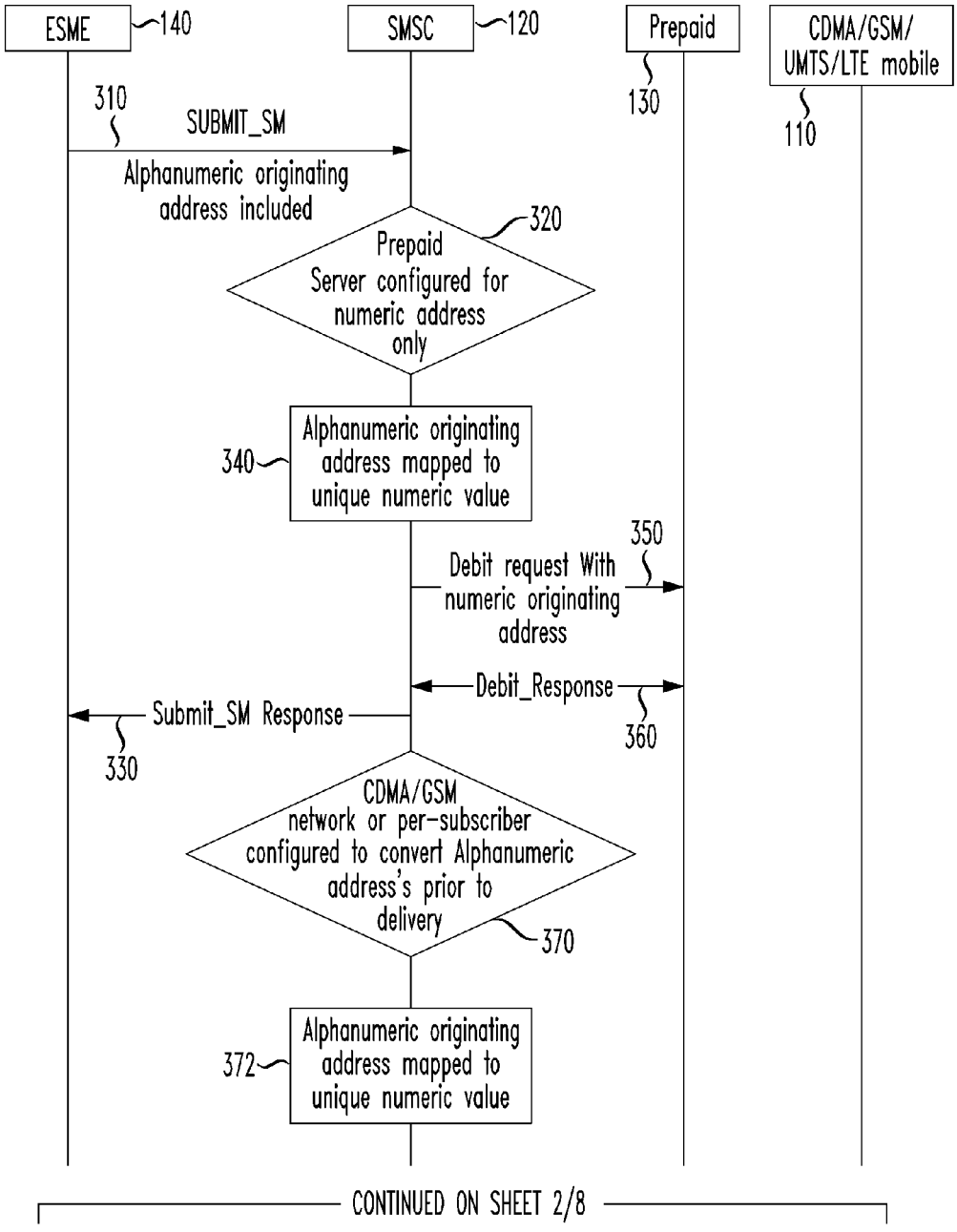

ESME
140
SMSC
120
Prepaid
130
CDMA/GSM/
UMTS/LTE mobile
110
310
SUBMIT_SM
Alphanumeric originating address included
320
Prepaid Server configured for numeric address only
340
Alphanumeric originating address mapped to unique numeric value
350
Debit request With numeric originating address
Debit_Response
360
Submit_SM Response
330
CDMA/GSM network or per-subscriber configured to convert Alphanumeric address's prior to delivery
370
372
Alphanumeric originating address mapped to unique numeric value
CONTINUED ON SHEET 2/8

FIG. 1

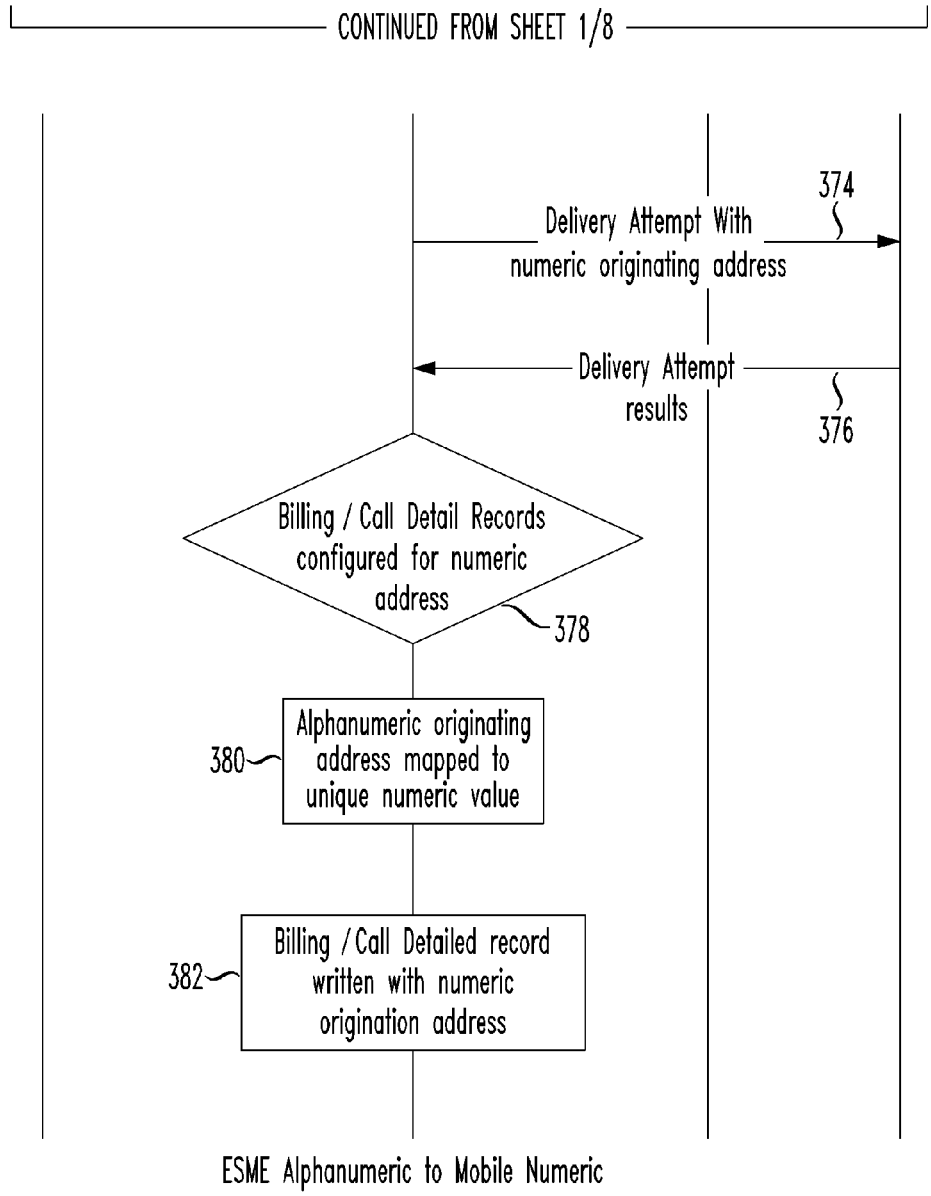

CONTINUED FROM SHEET 1/8
374
Delivery Attempt With numeric originating address
Delivery Attempt results
376
Billing / Call Detail Records configured for numeric address
378
380
Alphanumeric originating address mapped to unique numeric value
382
Billing / Call Detailed record written with numeric origination address
ESME Alphanumeric to Mobile Numeric

FIG. 2

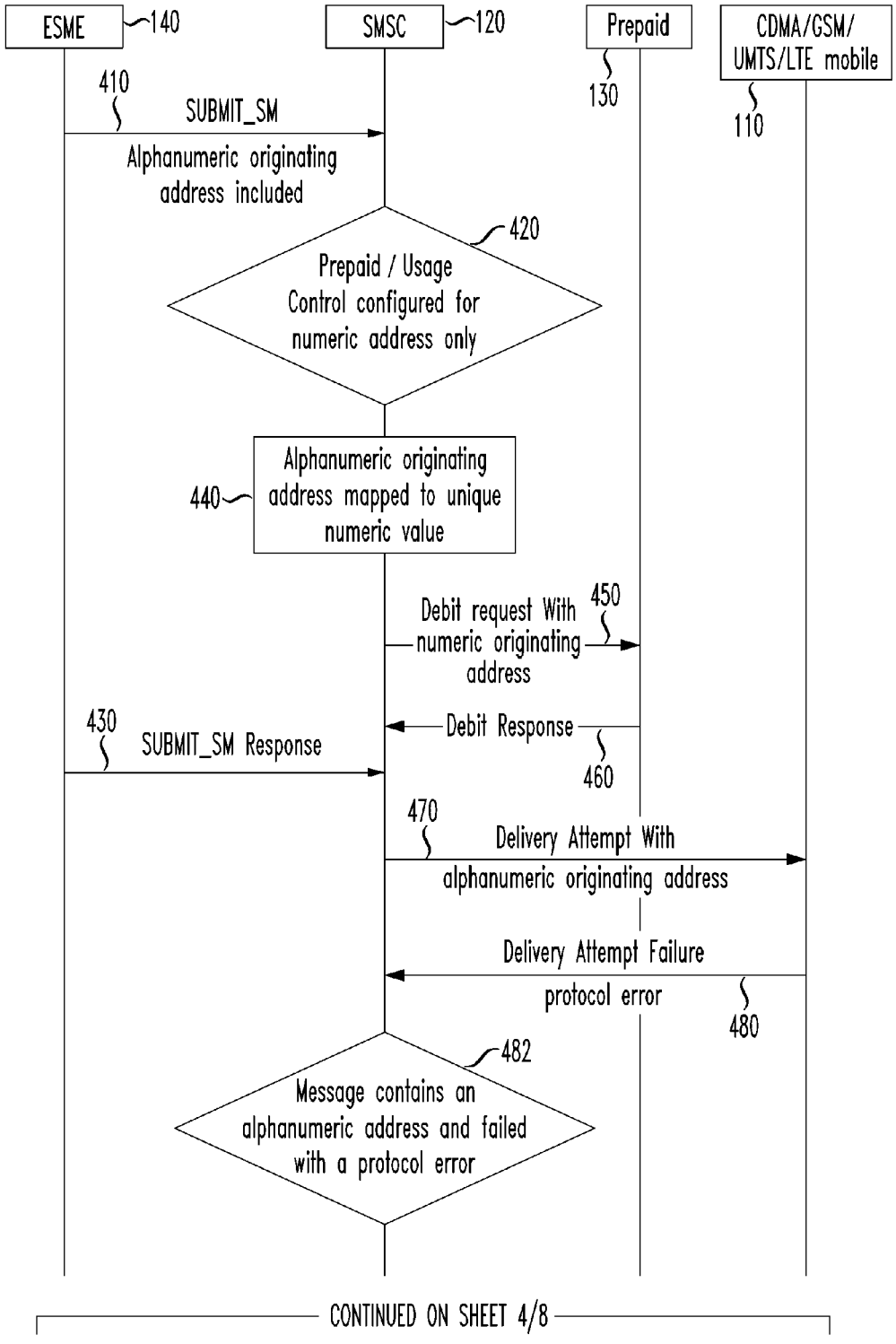

ESME
140
SMSC
120
Prepaid
130
CDMA/GSM/
UMTS/LTE mobile
110
410
SUBMIT_SM
Alphanumeric originating
address included
420
Prepaid / Usage
Control configured for
numeric address only
440
Alphanumeric originating
address mapped to unique
numeric value
Debit request With
numeric originating
address
450
430
SUBMIT_SM Response
Debit Response
460
470
Delivery Attempt With
alphanumeric originating address
Delivery Attempt Failure
protocol error
480
482
Message contains an
alphanumeric address and failed
with a protocol error
CONTINUED ON SHEET 4/8

FIG. 2

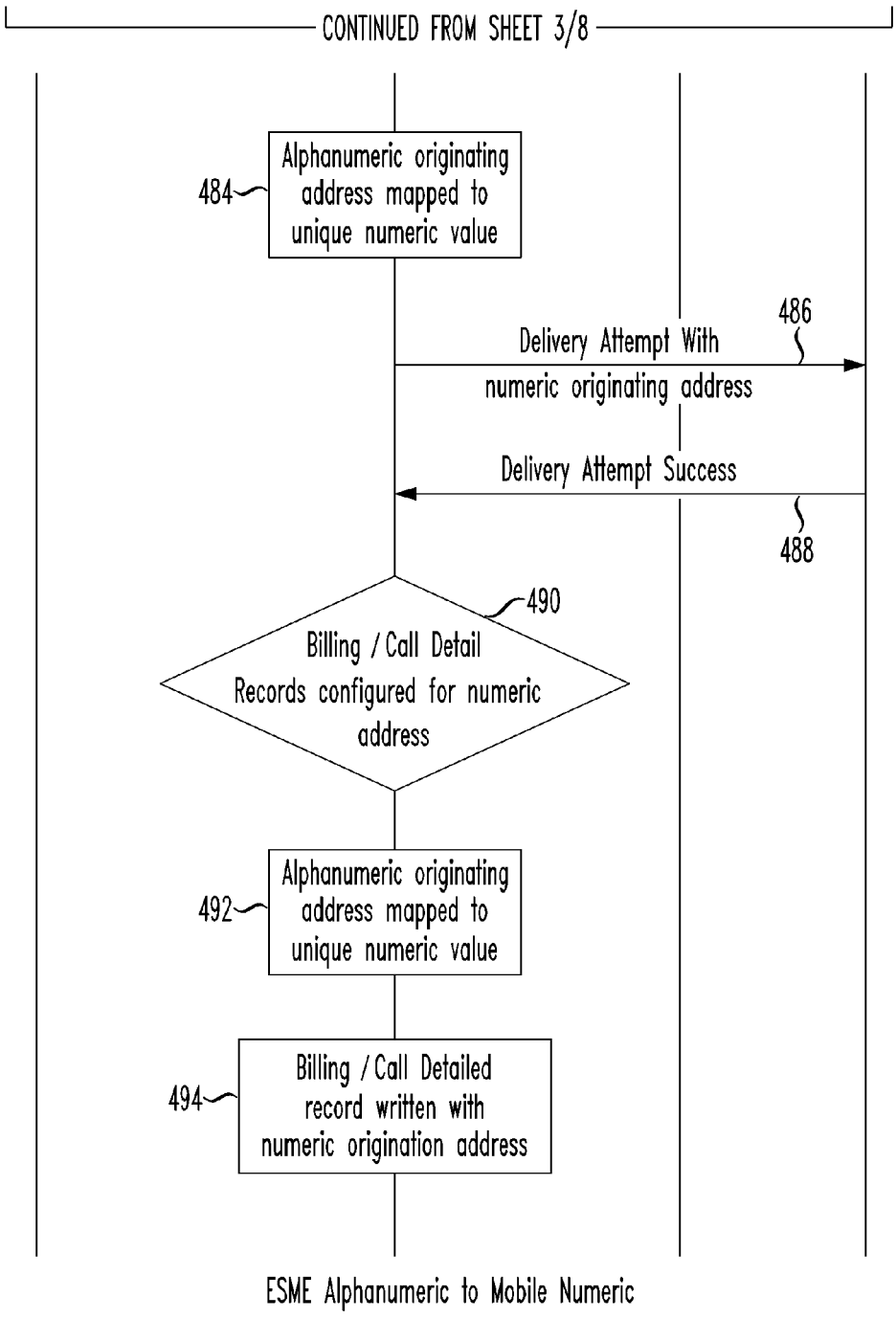

CONTINUED FROM SHEET 3/8
484
Alphanumeric originating address mapped to unique numeric value
486
Delivery Attempt With numeric originating address
Delivery Attempt Success
488
490
Billing / Call Detail Records configured for numeric address
492
Alphanumeric originating address mapped to unique numeric value
494
Billing / Call Detailed record written with numeric origination address
ESME Alphanumeric to Mobile Numeric

FIG. 3

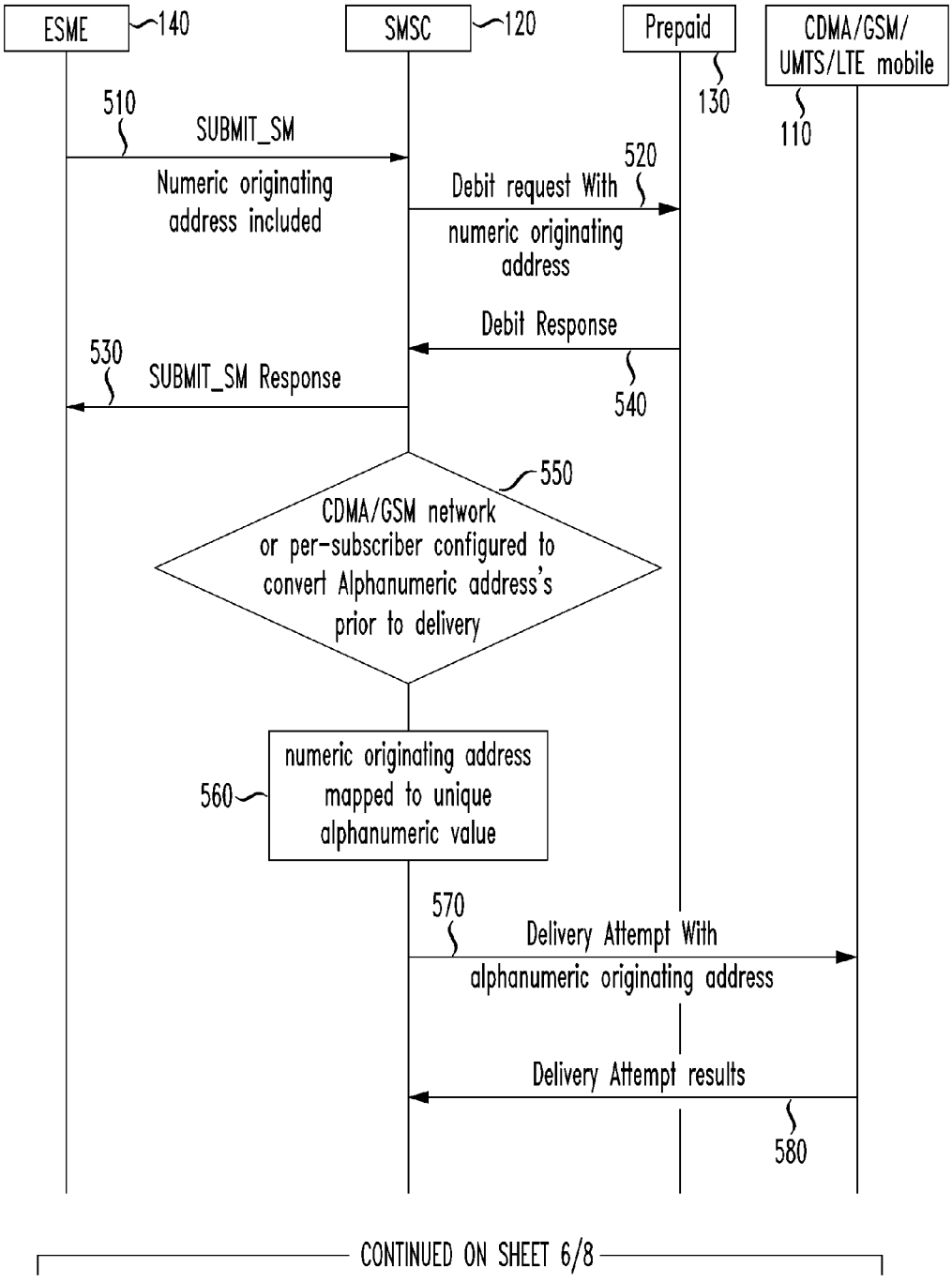

ESME
140
SMSC
120
Prepaid
130
CDMA/GSM/
UMTS/LTE mobile
110
510
SUBMIT_SM
Numeric originating
address included
520
Debit request With
numeric originating
address
Debit Response
540
530
SUBMIT_SM Response
550
CDMA/GSM network
or per-subscriber configured to
convert Alphanumeric address's
prior to delivery
560
numeric originating address
mapped to unique
alphanumeric value
570
Delivery Attempt With
alphanumeric originating address
Delivery Attempt results
580
CONTINUED ON SHEET 6/8

FIG. 3

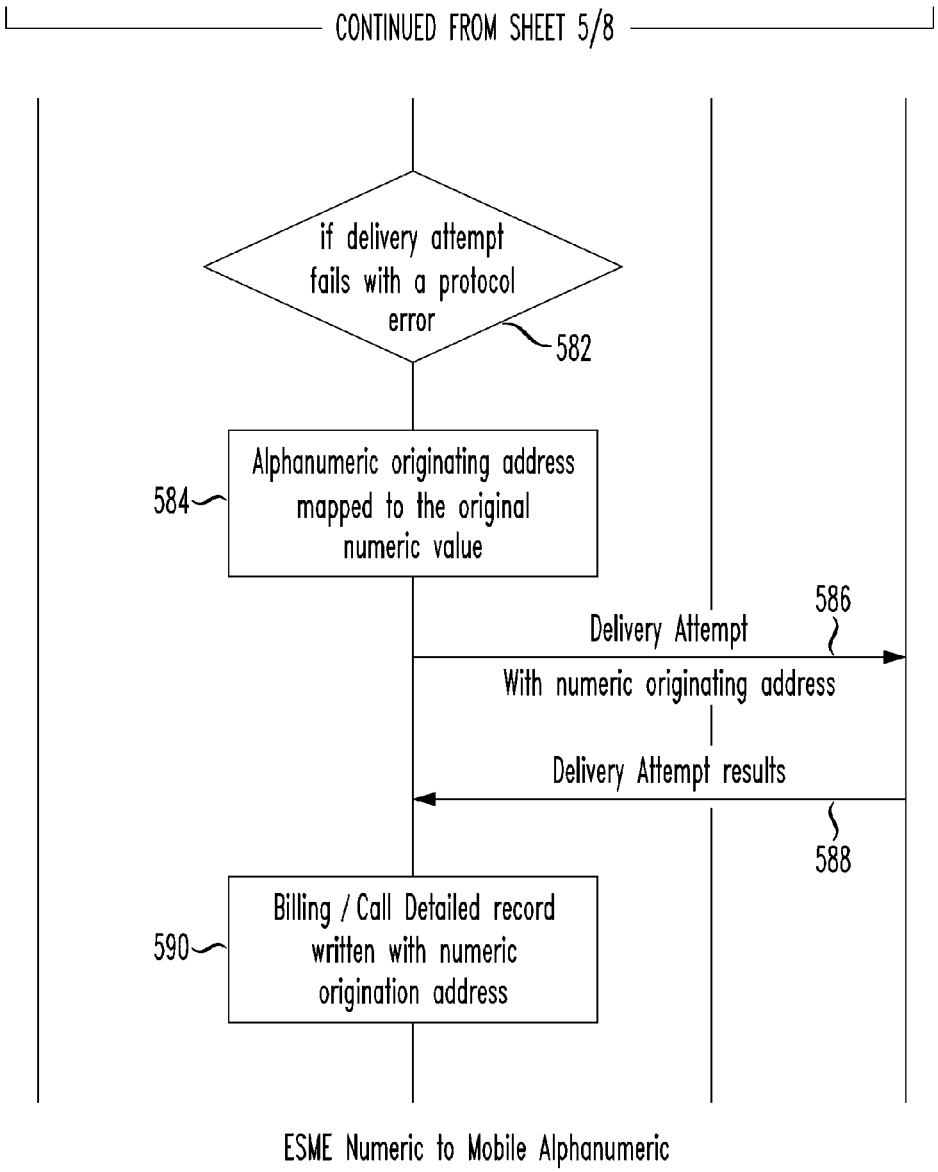

CONTINUED FROM SHEET 5/8
if delivery attempt fails with a protocol error
582
584
Alphanumeric originating address mapped to the original numeric value
586
Delivery Attempt
With numeric originating address
Delivery Attempt results
588
590
Billing / Call Detailed record written with numeric origination address
ESME Numeric to Mobile Alphanumeric

FIG. 4

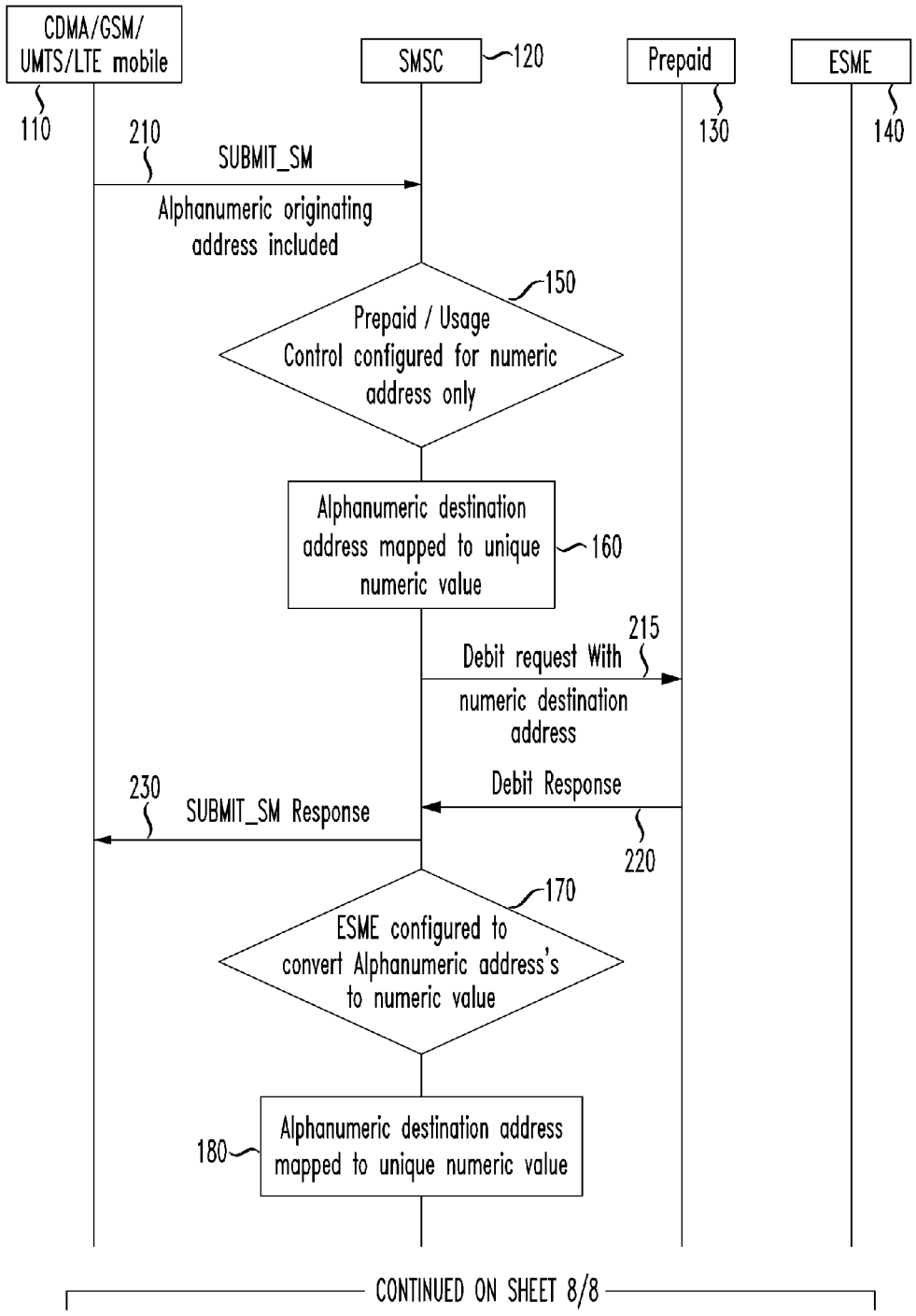
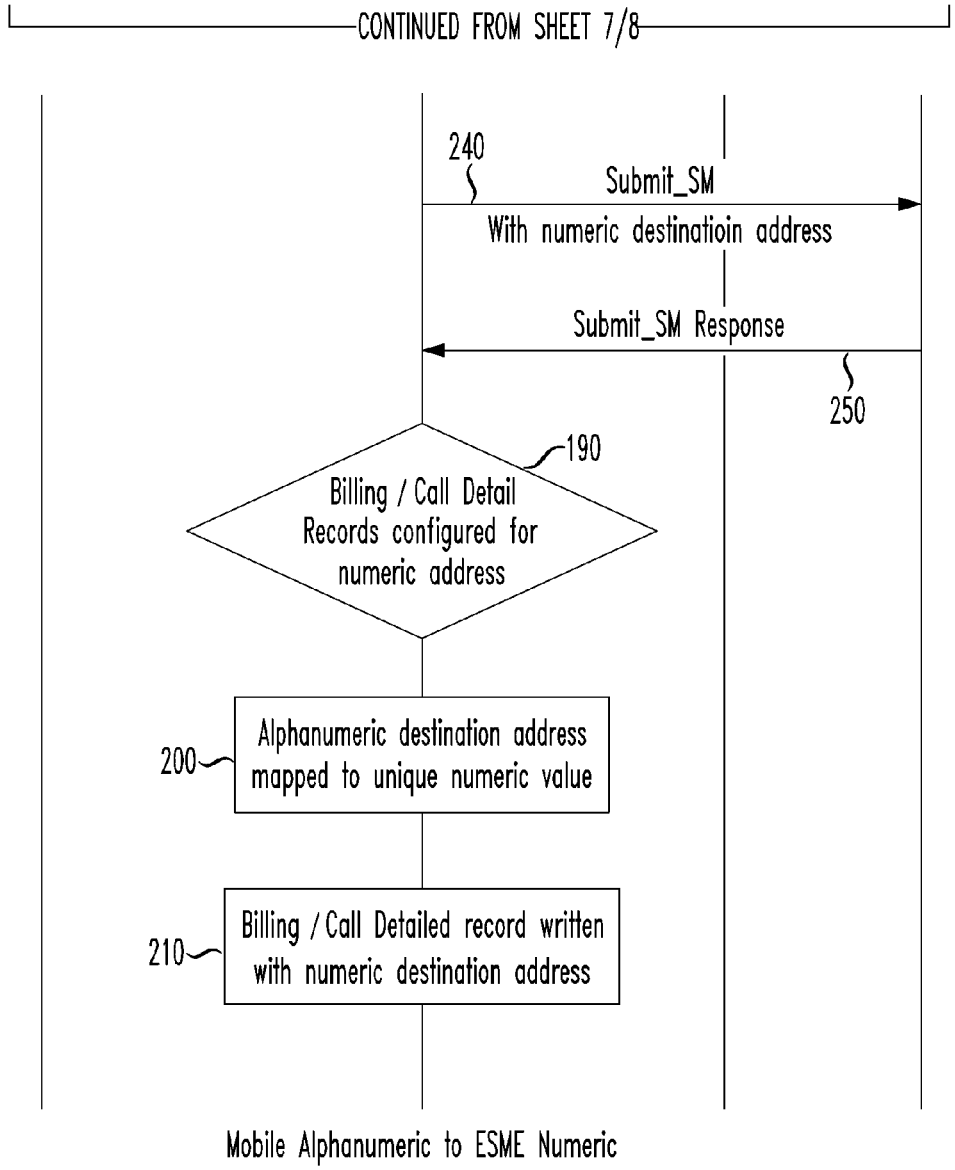

CDMA/GSM/
UMTS/LTE mobile
110
SMSC
120
Prepaid
130
ESME
140
210
SUBMIT_SM
Alphanumeric originating address included
150
Prepaid / Usage Control configured for numeric address only
Alphanumeric destination address mapped to unique numeric value
160
215
Debit request With numeric destination address
Debit Response
220
230
SUBMIT_SM Response
170
ESME configured to convert Alphanumeric address's to numeric value
180
Alphanumeric destination address mapped to unique numeric value
CONTINUED ON SHEET 8/8

FIG. 4


CONTINUED FROM SHEET 7/8
240
Submit_SM
With numeric destinatioin address
Submit_SM Response
250
190
Billing / Call Detail Records configured for numeric address
200
Alphanumeric destination address mapped to unique numeric value
210
Billing / Call Detailed record written with numeric destination address
Mobile Alphanumeric to ESME Numeric

ALPHANUMERIC ADDRESS MAPPING FOR NON-HOMOGENEOUS SHORT MESSAGE NETWORKS

This application claims priority from U.S. Provisional No. 61/457,084, entitled "ALPHANUMERIC ADDRESS MAPPING FOR NON-HOMOGENEOUS SHORT MESSAGE NETWORKS" to Paul CASTO, Lewis TUTTLE, and Donghong GAO, filed Dec. 23, 2010, the entirety of which is expressly incorporated herein by reference.

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates generally to telecommunications. More particularly, it relates to wireless based technologies.

2. Background of the Related Art

When a short message service center (SMSC) operates in a long term evolution (LTE)/CDMA (or GSM/CDMA, or UMTS/CDMA) dual mode network, the vast majority of GSM, UMTS and LTE mobiles support alphanumeric addressing where as many or most CDMA mobiles may not. This impacts the display of the originator of the message to the end-user of the mobile phone (or conversely the terminator, when the user is replying). Many corporations would like messages that they send to an end-user to appear with some form of corporate branding. E.g. ABXCorp would rather have the end user see a message from ABXCorp, rather than see that they have a message from 12345, and then have to figure out what those numbers represent.

A similar issue is also found in supporting external short message entities (ESMEs) from two different vendors. Some ESMEs support alphanumeric addressing while others do not.

Currently, if the mobile or ESME does not allow for message delivery with alphanumeric addresses encoded, the message to the mobile or the ESME may be discarded.

Alternatively, for messages destined to a Mobile, a generic numerical address may be substituted for the alphanumeric address, but a substituted generic numerical address is not meaningful to the Mobile end-user.

Many GSM/UMTS/LTE handsets support alphanumeric addresses. Some CDMA handsets may support alphanumeric (IA5) addresses. SMPP standard supports alphanumeric addresses, but many ESMEs/SMPP gateways have not fully implanted that portion of the standard. Thus, while end-points (some handsets and some ESMEs) may support alphanumeric addressing, the support for end-to-end alphanumeric addressing is not always complete.

ESMEs that are aware that a particular end-user handset has the alphanumeric capability could attempt delivery using that format, but that would require the ESME to maintain information about every phone number that it is sending to. Moreover, an ESME maintaining information about every phone number that it is sending to would be very susceptible to the user changing handset models.

Messages that are deleted due to protocol errors (e.g. handset cannot decode an address with alphanumeric characters) result in non-delivery to the subscriber. Messages that have had generic 'alphanumeric to generic' translation rules applied arrive at the handset without allowing the handset device to obtain the identity of the originator, thus also preventing the user device from responding.

SUMMARY OF THE INVENTION

In accordance with the principles of the present invention, a method of handling alphanumeric address mapping for a non-homogeneous short message network comprises receiving a message including an alphanumeric origination address, from an external short message entity (ESME), destined for a terminating mobile device. Mapping the alphanumeric origination address identifying the originating sender's address to a digit string identifying the originating sender's address prior to the first attempt to deliver the message to the terminating mobile device. The message is then routed to a terminating mobile device including numeric destination addressing.

A method of handling alphanumeric address mapping for a non-homogeneous short message network in accordance with another embodiment of the invention comprises receiving a message including an alphanumeric origination address identifying an originating sender from an external short message entity (ESME). The message is routed to a terminating mobile device including alphanumeric origination addressing. A failed delivery message relating to failure of the message is received. The alphanumeric origination address identifying the originating sender is mapped to a digit string that provides an alternative identification of the originating sender. The message is routed to the terminating mobile device including numeric destination addressing. This provides support for the use cases where the originating ESMEs (and intervening infrastructure) provides the capability to originate messages from alphanumeric addresses, but the receiving devices include a range of network types (LTE/CDMA/UMTS/GSM) and handset types, some of which do support receiving these messages, others of which can not.

Yet another embodiment of the invention discloses a method of handling alphanumeric address mapping for a non-homogeneous short message network. A message is received including a numeric origination address identifying the originating sender from an external short message entity (ESME). The numeric origination address identifying the originating sender is mapped to an alphanumeric string identifying the an alphanumeric address for the originating sender, prior to a first attempt to deliver the message to the terminating mobile device. The message is routed to a terminating mobile device including alphanumeric originating address. This provides support for the use cases where the originating ESMEs (or intervening infrastructure) lacks the capability to originate messages addressed from an alphanumeric address, yet some, or all of the handsets (and supporting infrastructure) has the capability to receive such messages. A further fallback to the first embodiment is also possible in this case.

Still another embodiment discloses a method of handling alphanumeric address mapping for a non-homogeneous short message network. A message is received including an alphanumeric destination address identifying a terminating external short message entity (ESME), from a mobile device. It is determined through configuration that the terminating external short message entity (ESME) requires numeric addressing. The alphanumeric destination address is converted to a digit address. The message addressed with the digit address is routed to the external short message entity (ESME). This provides support for the use cases where the originating handsets (and intervening infrastructure) provide the capability to originate messages addressed to an alphanumeric ESME address (including the case of 'reply to' alphanumeric addresses), but the ESME (or intervening infrastructure) lacks the capability to receive such messages.

BRIEF DESCRIPTION OF THE DRAWINGS

Features and advantages of the present invention become apparent to those skilled in the art from the following description with reference to the drawings:

FIG. **1** shows call flow from an alphanumeric addressing external short message entity (ESME) to a numeric addressing mobile device, for non-homogeneous short message networks, in accordance with the principles of the present invention.

FIG. **2** shows another exemplary call flow from an alphanumeric addressing external short message entity (ESME) to a numeric addressing mobile device, for non-homogeneous short message networks, in accordance with the principles of the present invention.

FIG. **3** shows call flow from a numeric addressing external short message entity (ESME) to an alphanumeric addressing mobile device, for non-homogeneous short message networks, in accordance with the principles of the present invention.

FIG. **4** shows call flow from an alphanumeric addressing mobile device to a numeric addressing external short message entity (ESME), for non-homogeneous short message networks, in accordance with the principles of the present invention.

DETAILED DESCRIPTION OF ILLUSTRATIVE EMBODIMENTS

The present invention delivers text messages with alphanumeric addresses to mobile devices and external short message entities (ESMEs) which do not support alphanumeric addressing, and provides meaningful fallback handling.

Additionally, the invention enables delivery of Short Message Peer to Peer (SMPP) messages from ESMEs or SMPP networks which can only originate numeric addresses, yet provide for mapping to alphanumeric addresses for delivery to a destination wireless mobile device.

The present invention adapts technology which is available within various telecommunication standards, but under-used due to the challenges of interoperability in heterogeneous networks. The inventive solution provides a two-way mapping between alphanumeric addresses and short message system (SMS) short-codes to enable delivery of text messages with alphanumeric addressing in networks which contain mobiles and/or ESME's that lack support of alphanumeric addressing.

In accordance with the invention, an ESME can send a text message using an alphanumeric origination address, without the need to know which handsets support the capability, and which do not, or whether handsets are on CDMA, or GSM, or UMTS, or long term evolution (LTE) networks, or can continue to send using a numeric origination address. The Short Message Servicing Center (SMSC) provides conversions to alphanumeric addresses on behalf of the ESME and mobile device.

This supports mapping of source and originating addresses both from and to numeric addresses, and mapping of numeric source addresses to alphanumeric for ESME_>Mobile Terminated call flows.

The configuration of the mapping is preferably accomplished such that the number is a meaningful representation of the alphanumeric address. For example, if ABXCorp's short-code address is "12345", messages with an originating address of "ABXCorp" will fall back to "12345". In this manner, response messages addressed to either "ABXCorp" or "12345" are routed to the same destination ESME.

As an extension, or alternate to, the static mapping approach, ESMEs may also include a custom Tag Length Value (TLV) component of an SMPP message to provide an alternate origination address. This allows ESMEs to provide address information in a dynamic fashion, without need for provisioning of a translation table at the SMSC, and still overcomes cases where the infrastructure between the ESME and the SMSC does not support use of alphanumeric addresses directly.

Messages which fail to be delivered due to protocol errors, system or interface configuration, preferably trigger the SMSC **120** to convert the alphanumeric origination address to a meaningful numeric origination address.

In addition to per-message support, entire air-interfaces may be configured to convert alphanumeric addresses back to numeric.

For ESMEs connected to a specific port, the connection may be configured to convert addresses to numbers when alphanumeric addresses are not supported. ESMEs can also be configured by system-type to identify those which cannot support alphanumeric addressing. Or by alphanumeric name (e.g., messages to "ABXCorp" always get converted to "12345").

The present invention provides focus on four primary call flows shown in FIGS. **1** through **4**.

FIG. **1** shows call flow from an alphanumeric addressing external short message entity (ESME) to a numeric addressing mobile device, for non-homogeneous short message networks, in accordance with the principles of the present invention.

In particular, as shown in the call flow of FIG. **1**, a message originates from an external short message entity (ESME) with an alphanumeric originating address, and terminates to a mobile device where the ESME does not support alphanumeric addressing. These may be addressed in two ways, shown in FIG. **1** and FIG. **2**.

With respect to FIG. **1**, the air interface (such as CDMA) may be configured not to support alphanumeric addressing. This causes the message's alphanumeric origination address to be mapped to a digit string, prior to the first attempt. The second technique (shown in FIG. **2**) permits the message to fail delivery based on a failure response (such as protocol error), at which time, the SMSC then maps the alphanumeric origination address to a number and retries delivery of the message.

As shown in FIG. **1**, an exemplary call flow is described between an originating mobile device **110** (e.g., a CDMA/GSM/UMTS/LTE mobile), a short message service center (SMSC) **120**, a prepaid server **130**, and a receiving external short message entity (ESME) **140**.

The ESME **140** sends a Submit_SM message **310** including alphanumeric originating address to the SMSC **120**.

As depicted in module **320**, the prepaid server **130** is configured for numeric addressing only.

In step **340**, an alphanumeric originating address is mapped to a unique numeric value. The SMSC **120** sends a Debit request message **350** with numeric originating address to the prepaid server **130**.

The prepaid server **130** sends a Debit Response message **360** back to the SMSC **120**, which sends a Submit_SM Response message **330** to the ESME **140**.

In step **370** the CDMA or GSM network, or per-subscriber, is configured to convert alphanumeric addresses prior to delivery.

The alphanumeric originating address is mapped to a unique numeric value in step **372**.

The SMSC **120** sends a Delivery Attempt message with numeric originating address **374** to the CDMA or GSM or IMS or LTE mobile device **110**, which sends back a Delivery Attempt message **376** with results.

In step **378**, the SMSC **120** configures the billing/call detail records for a numeric address.

In step **380**, the alphanumeric originating address is mapped to a unique numeric value.

In step **382**, the billing/call detailed record is written with a numeric origination address.

FIG. **2** shows another exemplary call flow from an alphanumeric addressing external short message entity (ESME) to a numeric addressing mobile device, for non-homogeneous short message networks, in accordance with the principles of the present invention.

In particular, as shown in FIG. **2**, the ESME **140** sends a Submit_SM message **410** including alphanumeric originating address to the SMSC **120**.

As depicted in module **420**, the prepaid server **130** is configured for numeric addressing only.

In step **440**, an alphanumeric originating address is mapped to a unique numeric value. The SMSC **120** sends a Debit request message **450** with numeric originating address to the prepaid server **130**.

The prepaid server **130** sends a Debit Response message **460** back to the SMSC **120**, which sends a Submit_SM Response message **430** to the ESME **140**.

The SMSC **120** sends a Delivery Attempt with alphanumeric originating address to the mobile device **110** (e.g., a CDMA, GSM, IMS or LTE mobile device).

In response, a Delivery Attempt Failure message **480** with protocol error is sent from the mobile device **110** back to the SMSC **120**.

In step **482**, it is determined that the message containing an alphanumeric address failed with a protocol error.

In step **484** the alphanumeric originating address is mapped to a unique numeric value.

A Delivery Attempt message **486** with numeric originating address is sent to the mobile device **110**, which sends back a Delivery Attempt Success message **488**.

In step **490**, billing/call detail records are configured for numeric address.

In step **492**, the alphanumeric originating address is mapped to a unique numeric value.

In step **494**, the billing/call detailed record is written with a numeric origination address.

FIG. **3** shows call flow from a numeric addressing external short message entity (ESME) to an alphanumeric addressing mobile device, for non-homogeneous short message networks, in accordance with the principles of the present invention.

In particular, in the call flow of FIG. **3**, a message originates from an ESME terminating to a mobile device where the ESME sends a numeric address (but would prefer an alphanumeric address be used where possible). This call flow encompasses messages originating from an ESME with numeric originating addresses, and terminating to a mobile which may support alphanumeric addressing (based on per-interface or per subscriber rules). This causes the message's numeric origination address to be mapped to an alphanumeric string, prior to the first attempt. Should an attempt fail, due to protocol error, the fallback mapping occurs as with respect to the call flow of FIGS. **1** and **2**.

As shown in FIG. **3**, the ESME **140** sends a Submit_SM message **510** including a numeric originating address to the SMSC **120**.

The SMSC **120** sends a Debit Request message **520** with numeric originating address to the prepaid server **130**, which sends a Debit Response message **540** back to the SMSC **120**.

The SMSC **120** sends a Submit_SM Response message **530** to the ESME **140**.

In step **550**, the LTE, CDMA, UMTS, or GSM network, or per-subscriber, is configured to convert alphanumeric addresses prior to delivery.

In step **560** the numeric originating address is mapped to a unique alphanumeric value.

The SMSC **120** sends a Delivery Attempt with alphanumeric originating address message **570** to the mobile device **110** (e.g., a CDMA, GSM, UMTS or LTE mobile device).

In response, a Delivery Attempt results message **580** is sent from the mobile device **110** back to the SMSC **120**.

In step **582**, it is determined that the delivery attempt failed with a protocol error.

In step **584** the alphanumeric originating address is mapped back to the original numeric value.

A Delivery Attempt message **586** with numeric originating address is sent to the mobile device **110**, which sends back a Delivery Attempt results message **588**.

In step **590**, the billing/call detail records are written with a numeric origination address.

FIG. **4** shows call flow from an alphanumeric addressing mobile device to a numeric addressing external short message entity (ESME), for non-homogeneous short message networks, in accordance with the principles of the present invention.

In particular, in the call flow of FIG. **4**, a message originates from a mobile device with an alphanumeric destination address, and terminates to an ESME that does not support alphanumeric addressing. In this case, based on ESME configuration provisioning, the SMSC converts the alphanumeric destination address to a digit address and sends the text message to the ESME. Since ESMEs are relatively static, the requirement to convert is normally accomplished through configuration. While the invention encompasses a possible attempt followed by a retry, this is inefficient for the mobile originated (MO) to ESME case.

As shown in FIG. **4**, the short message service center **120** receives a Submit_SM type message **210** from the originating mobile device **110**, including an alphanumeric destination address.

A prepaid/usage control module **150** in the SMSC **120** receives the Submit_SM message **210**, and the prepaid/usage control module **150** is configured for numeric address only.

In step **160**, the alphanumeric destination address is mapped to a unique numeric value **160** within an appropriate module at the SMSC **120**.

In message **215**, a Debit request with numeric destination address is sent from the SMSC **120** to a prepaid module **130**. The prepaid module **130** returns a Debit Response to the SMSC **120**, and a Submit_SM Response is passed from the SMSC **120** to the originating mobile device **110**.

In step **170**, the SMSC **120** determines that the ESME **140** is configured to accept numeric values only, so there is a need to convert alphanumeric addresses to numeric value.

In step **180** an alphanumeric destination address is mapped to a unique numeric value.

In message **240** a Submit_SM with numeric destination address is sent from the SMSC **120** to the external short message entity (ESME) **140**.

In message **250** the ESME **140** sends a Submit_SM with response back to the SMSC **120**.

In step **190** the billing/call detail records configured for numeric address.

In step **200** the alphanumeric destination address is mapped to a unique numeric value.

In step **210** the billing/call detailed record written with numeric destination address.

There are numerous extensions envisioned within the scope of the principles of the present invention. For instance:

Tracking and retaining the handsets capabilities for a period of time. In this way, if an alphanumeric fails, subsequent messages are automatically converted, prior to the first attempt.

Configuring per-subscriber exceptions to the per-air-interface rules. This accommodates gradual adoption of handsets—particularly in the CDMA environment which supports IA5 encoding.

The present invention provides an SMSC module that provides a bridge between systems which have the capability to support addressing between wireless devices that may or may not be capable of dealing with alphanumeric addresses.

The present invention permits ESMEs to support a branded source to clearly identify the originator, e.g., a message from "ABXCorp" or a message from "12345"—Many vendors much prefer to put their brand name in front of a customer, rather than a short code.

The present invention has particular applicability to wireless carrier markets, e.g., to carriers having mixed LTE/CDMA or GSM/CDMA or UMTS/CDMA networks. The invention may be implemented in an SMSC that supports dual networks (e.g., CDMA network+LTE or GSM) where handsets receive text messages from ESMEs that show an originating alphanumeric address.

While prepaid debit is shown with respect to the embodiments of the present invention, the invention applies equally to post-paid embodiments.

While the invention has been described with reference to the exemplary embodiments thereof, those skilled in the art will be able to make various modifications to the described embodiments of the invention without departing from the true spirit and scope of the invention.

What is claimed is:

1. A method of providing two-way alphanumeric address mapping for a non-homogeneous short message network, comprising:

receiving a text message including an alphanumeric origination address including at least one non-numeric character identifying a terminating external short message entity (ESME), said alphanumeric origination address including at least one non-numeric character;

mapping, prior to a first attempt to deliver said text message to said terminating mobile device, said alphanumeric origination address including said at least one non-numeric character identifying said unique origination source, to a numeric digit-only short code associated with said terminating mobile device;

routing said text message with said numeric digit-only short code addressing to said terminating mobile device;

receiving a return text message including a numeric digit-only short code address from said ESME;

mapping said numeric digit-only short code address of said return text message to an alphanumeric destination address including at least one non-numeric character corresponding to said terminating mobile device; and

routing said return text message to said terminating mobile device.

2. The method of providing two-way alphanumeric address mapping for a non-homogeneous short message network according to claim **1**, further comprising:

configuring an air interface to said terminating mobile device not to support alphanumeric addressing, causing said text message's alphanumeric origination address to be mapped to said numeric digit-only short code prior to said first attempt to deliver said text message to said terminating mobile device.

3. The method of providing two-way alphanumeric address mapping for a non-homogeneous short message network according to claim **1**, whereby:

said ESME is configured to send a text message using an alphanumeric origination address, irrespective of a capability of said terminating mobile device to support alphanumeric addressing, and irrespective of a network type of said terminating mobile device.

4. The method of providing two-way alphanumeric address mapping for a non-homogeneous short message network according to claim **3**, further comprising:

configuring an air interface to said terminating mobile device not to support alphanumeric addressing, causing said text message's alphanumeric origination address including at least one non-numeric character to be mapped to said numeric digit-only short code address prior to said first attempt to deliver said text message to said terminating mobile device.

5. A method of providing two-way alphanumeric address mapping for a non-homogeneous short message network, comprising:

receiving a text message including an alphanumeric origination address including at least one non-numeric character identifying a terminating external short message entity (ESME), said alphanumeric origination address including at least one non-numeric character;

routing said text message to said terminating mobile device with said alphanumeric origination address including at least one non-numeric character;

receiving a failed delivery message relating to failure of delivery of said text message;

mapping said alphanumeric origination address including at least one non-numeric character identifying said unique origination source, to a numeric digit-only short code string identifying said ESME; and

routing said text message with said numeric digit-only short code string addressing to said terminating mobile device.

6. The method of providing two-way alphanumeric address mapping for a non-homogeneous short message network according to claim **5**, whereby:

said ESME is configured to send a text message using an alphanumeric origination address, irrespective of a capability of said terminating mobile device to support alphanumeric addressing, and irrespective of a network type of said terminating mobile device.

7. A method of providing two-way alphanumeric address mapping for a non-homogeneous short message network, comprising:

receiving, from a mobile device, a text message including an alphanumeric destination address including at least one non-numeric character identifying a terminating external short message entity (ESME);

mapping said alphanumeric destination address including at least one non-numeric character to a numeric digit-only short code address;

routing said text message with said numeric digit-only short code address to said terminating external short message entity (ESME);

receiving a return text message including a numeric digit-only short code address from said ESME;

mapping said numeric digit-only short code address of said return text message to an alphanumeric destination

address including at least one non-numeric character corresponding to said mobile device; and

routing said return text message to said mobile device.

8. The method of providing two-way alphanumeric address mapping for a non-homogeneous short message network according to claim **7**, wherein:

a Short Message Servicing Center (SMSC) provides conversions of numeric-only addresses to alphanumeric addresses including alpha characters on behalf of said terminating external short message entity (ESME).

* * * * *